

REMARKS

In the Office Action, the Examiner rejected claims 1-39. By the present response, Applicants have amended claim 31 to correct a minor typographical error and have canceled claims 18-27, 32, 33, 37 and 38 without prejudice. Accordingly, claims 1-17, 28-31, 34-36, and 39 will remain pending in the present application and are believed to be in condition for allowance. In view of the following remarks, Applicants respectfully request reconsideration and allowance of all pending claims.

Amendments to the Specification

By this response, Applicants have amended certain paragraphs of the specification, as noted above, in order to cure minor typographical errors. Applicants respectfully assert that the amendments do not add any new matter and were not made for reasons related to patentability. As such, Applicants respectfully request the Examiner enter these amendments into the specification.

Rejections Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 1-39 under 35 U.S.C. § 103(a) as being unpatentable over Taguchi et al., U.S. Patent No. 5,807,256 (hereinafter referred to as “Taguchi”) in view of Carrott et al., U.S. Patent No. 6,909,792 (hereinafter referred to as “Carrott”). Applicants respectfully traverse the rejection.

Legal Precedent

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (B.P.A.I. 1979). To establish a *prima facie* case, the Examiner must not only show that the combination includes *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). In establishing a *prima facie* case for obviousness, “the scope and content of the

prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined.”

KSR Int'l Co. v. Teleflex, Inc., 127 S. Ct. 1727 at 1729 (2007).

Independent Claim 1

As stated above, the Examiner rejected independent claim 1 as being unpatentable over the combination of the Taguchi and Carrott references. Applicants respectfully traverse this rejection. Independent claim 1 recites, *inter alia*, “generating a *temporal change image* based upon first and second images from different times by segmenting the first and second images and registering at least a portion of the segmented images with one another” and “analyzing the *temporal change image* via at least one CAD [(computer aided detection/diagnosis)] algorithm.” (Emphasis added).

Applicants note that in the instant rejection, the Examiner acknowledged that Taguchi fails to disclose the recited steps (e.g., segmentation and registration) for generating a temporal change image, but instead relied on the Carrott reference for such teachings. *See* Office Action, page 3. However, even assuming that the combination of Taguchi and Carrott discloses generating a temporal change image using the steps recited by independent claim 1, Applicants submit that neither reference appears to disclose analyzing a *temporal change image* via at least one CAD algorithm.

To the extent that Taguchi appears to discuss the use of CAD algorithms in analyzing medical images, it does not appear that Taguchi ever discloses the use of CAD algorithms in analyzing a *temporal change image*. In support for the assertion that Taguchi discloses the use of a CAD algorithm for analyzing a temporal change image, the Examiner cited to several passages of the Taguchi reference. *See id.* (noting that the Examiner cited to column 45, lines 51-65; column 54, lines 27-37; and column 81, lines 25-41 of Taguchi). However, after careful review, Applicants do not believe that any of

the cited passages discloses analyzing a temporal change image using a CAD algorithm, as alleged by the Examiner.

First, Applicants direct the Examiner's attention to column 45, lines 51-65 of Taguchi. This passage merely describes a method in which a CAD algorithm is applied to a digital image, such as a chest X-ray image. *See* Taguchi, col. 45, lines 44-55; Fig. 37. Simultaneously, a doctor (or other qualified medical personnel) interprets the *same* image and inputs his or her findings into a computer workstation. *See id.* Subsequently, the regions identified by the doctor as either "normal" or "abnormal" are compared to the results of the CAD analysis on the digital image. Thus, while this cited passage may indeed discuss the use of a CAD algorithm on a digital image, Applicants submit that there is absolutely no teaching that the CAD algorithm is used to analyze a temporal change image. Indeed, as noted above, the cited passage merely refers to a chest X-ray image.

The next passage cited by the Examiner can be found at column 54, lines 27-37 of Taguchi. Applicants note that this passage describes that various types of CAD processing routines may be applied to a given image. *See id.*, col. 54, lines 5-37; Figs. 45-46. For example, Figs. 45 and 46 of Taguchi each illustrate an image representative of human lungs, to which a first CAD algorithm for detecting pulmonary nodules and a second CAD algorithm for detecting signs of interstitial lung disease may be applied. *See id.* Again, however, Applicants note that nothing in the cited passage mentions that either of the discussed CAD algorithms is being applied to a temporal change image.

Finally, the Examiner cited column 81, lines 25-41 in support of the allegation that Taguchi discloses CAD analysis of a *temporal change image*. However, Applicants note that this passage appears merely to describe that one or more CAD algorithms may be applied to a plurality of images. For example, Taguchi states that given a plurality of images (e.g., images to be interpreted and previously acquired images), and multiple

abnormality detection operations (e.g., CAD algorithms for detecting pulmonary nodules and interstitial lung disease) may be performed on *each* sheet of images. *See id.* col. 81, lines 25-41. However, Applicants submit that the use of multiple CAD algorithms on each of a plurality of images is *clearly* not the equivalent of performing CAD analysis on a temporal change image, as recited by independent claim 1.

Accordingly, Applicants do not believe any of the passages cited by the Examiner in support of the instant rejection of independent claim 1 teach or suggest analyzing a *temporal change image* using at least one CAD algorithm. Moreover, it does not appear that Taguchi generates a temporal change image at all. At best, it appears that Taguchi discusses the use of a temporal change data table, in which quantitative data regarding abnormalities detected by applying the above discussed CAD algorithms (e.g., pulmonary nodule detection, interstitial lung disease detection) to *non*-temporal change images (e.g., chest X-ray image) are stored. *See id.* col. 64, lines 60-65; *see also* Figs. 49-50 (illustrating examples of temporal change data tables).

Further, to the extent that the Examiner has relied on Carrott to teach the generation of a temporal change image, Applicants note that the use of CAD algorithms is *never* discussed anywhere in the Carrott reference. Therefore, Applicants submit that the Taguchi and Carrott references, taken alone or in combination, cannot possibly disclose the analysis of a temporal change image using at least one CAD algorithm, as recited by independent claim 1. Accordingly, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. § 103(a) of independent claim 1, as well as those claims depending therefrom.

Independent Claim 9

Applicants note that independent claim 9 recites a method comprising “analyzing a first image via at least one CAD algorithm to identify a feature of interest” and “*if a feature of interest is identified in the first image, accessing a second image from a*

different time than the first image..." (Emphasis added). In other words, the method recited by independent claim 9 uses the results of the CAD analysis on a first image as a triggering mechanism to initiate the search for and analysis of a second image taken at a different time than the first triggering image.

In the instant rejection of independent claim 9, the Examiner again cited column 81, lines 25-41 in support of the assertion that the recited subject matter is disclosed in the Taguchi reference. However, as already discussed above, Applicants note that column 81, lines 25-41 merely suggests that CAD algorithms may be applied to each of a plurality of images (e.g., *each sheet* of images). *See id.* col. 81, lines 25-41. Although the application of multiple CAD algorithms to each image may detect and confirm abnormalities in one image, this method described by Taguchi is *clearly* not analogous with the method of claim 9, which would require that the results of CAD analysis on a first image are used as a triggering mechanism to initiate the search for and analysis of a second image from a different time than the first image.

The Examiner further cited column 6, lines 50-62 of the Taguchi reference in support of the allegation that Taguchi teaches the recited subject matter of claim 9. This passage appears to discuss detecting an anomaly in a first image, and then *creating a second image* which is a "minified" version of the first image combined with an arrow pointing to the anomaly, and then superimposing the second image on the first image. *See id.* col. 6, lines 50-62; col. 17, lines 11-27; Figs. 4-9. However, Applicants submit that this type of processing technique is not equivalent nor analogous to searching for and accessing a second image if a feature of interest is identified in a first image. Further, even assuming hypothetically that the creation of this "minified" second image could be interpreted as triggering "accessing of a second image," Applicants note that the second image is a "minified" version or subset of the *original* image and thus is *clearly* not "from a different time," as would be required by the method of independent claim 9.

Accordingly, Applicants submit that Taguchi fails to disclose every element recited by independent claim 9.

Moreover, with regard to the Examiner's use of the Carrott reference in the rejection of independent claim 9, Applicants note that the Examiner again relied on Carrott solely for the teaching that Carrott allegedly discloses the generation of a temporal change image. *See* Office Action, page 5. However, as discussed above, Carrott fails to teach or suggest the use of CAD algorithms, and thus cannot obviate the deficiencies of Taguchi. Thus, for at least the reasons discussed above, the Taguchi and Carrott references, alone or in combination, cannot render obvious independent claim 9.

Accordingly, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. § 103(a) of independent claim 9, as well as those claims depending therefrom.

Independent Claim 28

The Examiner also rejected independent claim 28 as being unpatentable over Taguchi in view of Carrott. Applicants respectfully traverse this rejection. Independent claim 28 recites, *inter alia*, "analyzing a first image via at least one CAD algorithm to identify a feature of interest" and "*if a feature of interest is identified in the first image, accessing a second image from a different time than the first image...*" (Emphasis added). Applicants note that these particular steps of the recited method of independent claim 28 are essentially identical to the steps discussed above with regard to the method of independent claim 9. However, as discussed above, neither Taguchi nor Carrott teaches or suggests such a feature. Thus, for the same reasons discussed above with regard to independent claim 9, Applicants submit that the Taguchi and Carrott references, alone or in combination, cannot render obvious independent claim 28. Accordingly, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. § 103(a) of independent claim 28, as well as those claims depending therefrom.

Independent Claims 30 and 35

Applicants note that independent claims 30 and 35 recite a system and a computer program, respectively, which correspond to the recited method of independent claim 1. Specifically, independent claim 30 recites a system comprising, *inter alia*, “means for generating a temporal change image … means for analyzing the temporal change image via at least one CAD algorithm.” (Emphasis added). Independent claim 35 recites a computer program comprising, *inter alia*, “code … for generating a temporal change image … and analyzing the temporal change image via at least one CAD algorithm.” (Emphasis added).

As discussed above with regard to independent claim 1, Taguchi and Carrott, alone or in combination, fail to teach or suggest analyzing a temporal change image via at least one CAD algorithm. Therefore, Applicants believe that independent claims 30 and 35 are clearly patentable over the combination of the Taguchi and Carrott references for at least the reasons discussed above with regard to independent claim 1. Accordingly, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. § 103(a) of independent claims 30 and 35.

Independent Claims 31, 34, 36, and 39

Independent claims 31 and 36 recite a system and a computer program, respectively, which correspond to the recited method of independent claim 9. Independent claims 34 and 39 recite a system and a computer program, respectively, which correspond to the recited method of independent claim 28. Specifically, independent 31 and 34 each recite “means for analyzing a first image via at least one CAD algorithm for identifying a feature of interest … and means for accessing a second image from a different time than the first image if a feature of interest is identified in the first image.” (Emphasis added). Independent claims 36 and 39 each recite “a computer program comprising … code … for analyzing a first image via at least one CAD algorithm to identify a feature of interest … and if a feature of interest is identified in the

first image, accessing a second image from a different time than the first image.”
(Emphasis added).

As discussed above with regard to independent claims 9 and 28, Taguchi and Carrott, alone or in combination, fail to teach or suggest this particular claim feature. Therefore, Applicants submit that independent claims 31 and 36 are patentable over the combination of Taguchi and Carrott and that independent claims 34 and 39 are also patentable over the combination of Taguchi and Carrott for at least the reasons discussed above with regard to independent claims 9 and 28, respectively. Accordingly, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. § 103(a) of independent claims 31, 34, 36, and 39.

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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